

REFRIGERATOR AND A DOOR STORAGE COMPARTMENT

FOR THE REFRIGERATOR

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Cross-Reference to Related Application:

This application is a continuation, under 35 U.S.C. § 120, of
copending international application No. PCT/EP02/10751, filed
September 25, 2002, which designated the United States; this
10 application also claims the priority, under 35 U.S.C. § 119,
of German patent application No. 101 48 448.8, filed October
1, 2001; the prior applications are herewith incorporated by
reference in their entirety.

15 Background of the Invention:

Field of the Invention:

The present invention relates to a refrigerator and to a
storage compartment for mounting on the inside of a door of
the refrigerator.

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The doors of refrigerators, in particular domestic cabinet
refrigerators, are generally equipped with door storage
compartments on their inside, of which at least that which is
located at the lowest level is intended to hold drinks bottles
25 or other containers which are taller than they are broad. The
highest container that is stored in a storage compartment such

as this determines the separation that there must be between it and a storage compartment located above it.

In recent years, plastic bottles with a volume of 1.5 or 2
5 liters have been increasingly used for refreshment drinks, and these plastic bottles are considerably taller than conventional glass bottles, whose capacity is generally in the range between 0.5 and 1 liter. If the plastic bottles are intended to be stored together with other bottles of a smaller
10 format in one door storage compartment, this results in poor space utilization, since the distance from the bottle storage compartment to the compartment located above it must be sufficiently large to allow the largest bottle to be stored to be inserted without any difficulties, although, in general,
15 only a small number of the bottles in the bottle storage compartment are of this height.

In order to overcome this problem, doors for refrigerators have been developed with a vertical central bar, which allows
20 door storage compartments which each extend over only half the door width to be mounted at different levels to the right and left of the center bar. This solution is described, for example, in German Utility Model 90 14 463 is, however, not completely satisfactory since the center bar itself occupies
25 space that is no longer available for the storage of refrigerated items.

Summary of the Invention:

It is accordingly an object of the invention to provide a refrigerator and a door storage compartment for the refrigerator which overcomes the above-mentioned disadvantages of the prior art devices of this general type, which allows intensive utilization of the available storage volume.

With the foregoing and other objects in view there is provided, in accordance with the invention, a door storage compartment for a refrigerator. The door storage compartment contains at least one first section having a full first depth, and at least one second section having a second depth being less than the full first depth and follows the first section in a longitudinal direction of the door storage compartment. The second depth is less than half of the full first depth.

According to the invention, the object is achieved by a door storage compartment for a refrigerator that is formed from at least one section having a full depth and at least one section of having a smaller depth, which follow one another in the longitudinal direction of the door storage compartment.

The door storage compartment can be mounted on the inside of the refrigerator door at a vertical distance from a door storage compartment which is located underneath it, with this

vertical distance being less than the height of the tallest bottles to be stored in the bottle storage compartment.

Specifically, if a tall bottle is inserted underneath the section where the depth of the door storage compartment

5 according to the invention is less, its bottle neck can project upwards beyond the section of smaller depth. This section of smaller depth may be used for the storage of small objects, such as tubes. The storage compartments can thus be stacked in height on the door with a similar density to that
10 in the case of a door with a center bar, but with the additional advantage that additional storage space is available at the level of the neck of the tall bottles, in the form of the section of smaller depth.

15 In order to ensure that tall bottles are located in a stable manner, without being able to tilt, in the bottle storage compartment, the depth of the section of smaller depth is preferably less than half the depth of the section of full depth, which generally also corresponds to the depth of the
20 bottle storage compartment.

The first and second sections may have equivalent lengths or alternatively may have different lengths. Ideally, the first and second sections are formed as a one-piece part, and each
25 have a box-like shape.

The sections of the door storage compartment that have different depths are preferably each separated by an intermediate wall. This contributes to the robustness of the door storage compartment, and prevents bending when the door
5 storage compartment is loaded.

A horizontal reinforcing web on the intermediate wall is worthwhile as a further measure to improve the robustness. The horizontal reinforcing web preferably forms an upper end
10 of the intermediate wall.

The object is also achieved by a refrigerator having a housing and a door, with a second door storage compartment of the type defined above being mounted on the door, above a first door
15 storage compartment for the bottles.

Other features which are considered as characteristic for the invention are set forth in the appended claims.

20 Although the invention is illustrated and described herein as embodied in a refrigerator and a door storage compartment for the refrigerator, it is nevertheless not intended to be limited to the details shown, since various modifications and structural changes may be made therein without departing from
25 the spirit of the invention and within the scope and range of equivalents of the claims.

The construction and method of operation of the invention, however, together with additional objects and advantages thereof will be best understood from the following description
5 of specific embodiments when read in connection with the accompanying drawings.

Brief Description of the Drawings:

Fig. 1 is a diagrammatic, perspective view of a door storage
10 compartment according to a first embodiment of the invention;

Fig. 2 is a partial sectional view through the door storage compartment shown in Fig. 1, in the plane annotated II-II in Fig. 1;

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Fig. 3 is a perspective view of a second door storage compartment according to the invention;

Fig. 4 is a partial perspective view of an inner wall of a
20 refrigerator door with fitted door storage compartments; and

Fig. 5 is a sectional view of the door storage compartment.

Description of the Preferred Embodiments:

25 Referring now to the figures of the drawing in detail and first, particularly, to Fig. 1 thereof, there is shown a door

storage compartment 11 which has two sections 1, 2, each essentially in the form of a box which is open at the top. The section 1 has a "full" depth, that is to say its depth is sufficient in order, for example, to hold the base of a conventional 1.5 liter or 2 liter PET drinks bottle. The depth of the second section 2 is less than half that of the first section 1, preferably 30 to 40% of it. This allows a large drink bottle to be placed in a full-depth door storage compartment that is mounted on the same door inner face as the illustrated door storage compartment, but underneath, with the neck of the drink bottle being at the same level as the section 2, without abutting against the bottle and impeding its stable positioning.

In order to increase the bending stiffness of the door storage compartment when it is loaded, an intermediate wall 3 is provided in the area in which the two sections 1, 2 are adjacent to one another and connects front walls 4, 5 (which face the interior of the refrigerator) of the sections 1, 2 to an integral rear wall 6, which is common to the two sections 1, 2 and rests on the inner wall of the refrigerator door when the door storage compartment is installed. The intermediate wall 3 on the one hand prevents the rear wall 6 from bending laterally when subjected to a bending load, while on the other hand it forms a support for the front wall 5 of the section 2 of smaller depth.

In order to make the intermediate wall 3 as robust as possible with regard to horizontal forces that are exerted when a bending load is applied to the front wall 5, the intermediate wall 3 ends at its upper end with a reinforcing web 7, as is shown in detail in Fig. 2.

A cutout 8, which is open at the bottom, at the outer longitudinal end of the section 2 of smaller depth, as well as a corresponding cutout, which cannot be seen in Fig. 1, at the opposite end of the section 1 of the full depth are used for suspension of the door storage compartment on studs 9 (see Fig. 4) which are disposed at regular intervals on vertical bars 10 on the door inner wall, in order to allow the door storage compartments to be suspended at different levels.

In the example shown in Fig. 1, the longitudinal extent of the two sections 1, 2 is the same, that is to say the intermediate wall 3 of the installed door storage compartment is located approximately in the center of the door. A subdivision such as this is expedient for a compact refrigerator, where the longitudinal extent of each section 1, 2 corresponds approximately to the diameter of two large drinks bottles. Other proportions are, of course, also possible, as shown in Fig. 3. In this case, the ratio of the lengths of the section 1 of full depth and the section 2 of smaller depth is about

3:1, so that a large-format bottle can be stored in a storage compartment located underneath this, under the section 2 of smaller depth.

- 5 Fig. 4 shows a perspective partial view of the door inner wall of a refrigerator that is equipped with the door storage compartment 11 according to the invention. A further door storage compartment 12 whose depth is the same over its entire length is mounted in the lower area of the door inner wall.
- 10 The compartment 12 can hold large bottles in its right-hand half, underneath the section 2 of smaller depth, while compact containers such as tetrapacks, can expediently be inserted in the left-hand area, underneath the section 1 of full depth.
- 15 It is obvious that the door storage compartment 11 according to the invention is not restricted to two sections each having the same depth. For example, three sections may be provided, two sections of full depth and one of smaller depth between them, so that large bottles can be inserted centrally in a
- 20 compartment located underneath and are thus always equally well accessible, irrespective of whether the door is hinged on the right or left.

It is also feasible for the depth of the section 2 of smaller

25 depth to be reduced virtually to zero, so that a door storage compartment configured in this way can also be installed at a

level below the neck of a large bottle inserted in the compartment underneath.

A further modification option is for the front wall 5 of the section 2 of smaller depth to have an oblique profile, springing back downwards, in order in this way to make it possible to install the door storage compartment at the level of the neck attachment of bottles which are positioned underneath. As is shown in Fig. 5, in the case of a section 10 of smaller depth modified in this way, the base of the section may be omitted or reduced in order, for example, to allow tubes to be inserted vertically.